

Science Panel May Study Virginia Uranium Plan

BY BETTY JOYCE NASH

Renewed attention to nuclear power has stoked a worldwide rush for the chief constituent of reactor fuel, uranium. Its rising price makes the ore economically feasible to extract, and people are staking claims even on public lands, including the Grand Canyon.

Uranium is a metal that's slightly radioactive, found in rocks, soils, rivers, and seawater as well as in granite, fertilizers, and coal deposits. It's fairly common. But uranium in Virginia? A large deposit of uranium ore — possibly 119 million pounds, if geologists' assessments bear out — lies beneath Pittsylvania County's bucolic pastures.

But in Virginia, there's the small matter of a 1983 state moratorium on uranium mining. State legislators had rejected a uranium mine study, but a Virginia Coal and Energy Commission subcommittee has authorized negotiations with the National Academy of Sciences to study the idea. The stakes are high. The study could clarify long-term effects on air, water, and health. A separate analysis would compare costs to benefits of a domestic uranium supply, jobs, and possibly resource-tax money for the region.

Virginia's Southside

Walter Coles Sr. still remembers the early 1950s when a Geiger counter ticked up in response to what may be the biggest untapped source of uranium in the United States. The signal was so strong that the geologist who brought the device, a friend of his father's, thought it was broken. Nuclear was hot then. President Dwight Eisenhower had pitched "atoms for peace" in a 1953 speech to the United Nations. Nuclear fuel occupied a prominent place in a future of military might and peacetime energy.

Back then, as now, the two families who own the uranium deposits could have sold the land and/or the mineral rights for cash. But they want to mine it "for and by Virginians," Coles says, to shore up the economically depressed region. The deposit lies six miles north of Chatham, Va., a town of stately homes built in more prosperous times, in a region known as Southside. Some of the yards display signs against the uranium mine. Frankly, Southside could use the jobs. The company, Virginia Uranium, estimates those could number 300 to 500, and would include nuclear engineers, as well as heavy equipment operators, among others. The jobs and the possible taxes on the resource could spawn economic development and pay for education and conservation, among other efforts, Coles hopes. About 40 miles away, Babcock & Wilcox and Areva fabricate nuclear fuel, the former for military and the latter for commercial purposes.

Area farmers, according to Coles, often supplement farm income with other employment. Textile and furniture making have eroded, tobacco farming too. "We had raised tobacco until three years ago, since 1785," he remarks on a

drive from the Chatham office to the property. He plants hay for his hobby, 150 head of cattle. Even he left home as a young man because there would not have been enough income to support two families on the farm. He served in Vietnam, and later worked on peacekeeping there, followed by a foreign service career with the State Department, from which he retired in 2004.

Under the property lies a geographical fault, and to the west of it, "two approximately 350 meter long by 250 meter wide ellipsoidal mineral deposits." Those deposits of uranium lie in igneous rocks, hard rocks, but to be used as fuel must be processed to a gas and then further "enriched" into uranium oxide pellets. The ore would likely be excavated in an open pit, using water to damp down the dust. The mill would crush and chemically extract the uranium. The resulting uranium oxide, "yellowcake," would go to a conversion plant such as the one in Metropolis, Ill., and then to the nation's only enrichment plant in Paducah, Ky., before it's in any kind of geophysical shape to fuel reactors.

Contaminated leftover materials and chemicals used in this kind of extraction process typically are collected in retention ponds. The prospect of overflow or failure of impoundments worries the state's biggest environmental group because of Virginia's comparatively rainy climate. Most mines are out West, in arid climates, or in remote regions of Canada. At least one city that gets its drinking water from reservoirs downstream, Virginia Beach, has opposed it.

When the mine closes, the property will be placed in a conservation easement, Coles says. Back on the farm, where the original land grant that bears Thomas Jefferson's signature hangs on the wall of the circa 1817 home, nothing happened after the initial screech of the Geiger counter. In 1979, however, Marline and Union Carbide drilled core samples until 1984 under mineral rights leased from the two families that own the land. The firms back then also leased mineral rights to 16,000 acres in Fauquier, Orange, Culpeper, and Madison counties.

Uranium Supply and Demand

There was even an economic impact study on the possible Coles Hill uranium mine. But demand collapsed and the leases eventually expired in the wake of core meltdowns in 1979 at Three Mile Island, and 1986 at Chernobyl. Cost overruns, nuclear disarmament, and overestimates of electricity demand also killed the 124 nuclear reactors then on the drawing board.

But nuclear's looking, if not hot, then lukewarm. Nuclear reactors don't directly emit carbon. If carbon is priced anytime soon, then nuclear's high capital costs might seem more competitive. Per kilowatt hour, excluding any long-

term waste or capital costs, nuclear generated electricity is cheaper than coal or gas. Nuclear does leave a footprint, though. Worldwide, uranium mines release carbon, processors discharge chlorofluorocarbons, also a greenhouse gas, and then there's that unsolved mystery — waste storage. More nuclear waste repositories such as Nevada's Yucca Mountain would be required if reactors really had to take up the electricity slack.

The Energy Policy Act of 2005 offered investment tax credits and subsidies for construction, among other nuclear perks. That and the industry's longtime federal insurance caps on accident liability have helped propel nuclear energy, and, by extension, uranium prices.

Virginia Uranium estimates its gross revenues at about \$280 million annually depending on uranium prices, which long term are expected to average \$70 per pound. An average mill, says project manager Patrick Wales, is likely to produce around 3.5 million to 4 million pounds a year, for 30 years, roughly.

Back in the mid-1970s, uranium prices reached roughly \$112 per pound, in 2006 dollars. Uranium sold for \$7 a pound in 2002; the price is now about \$42 per pound, down from \$136 a pound in 2007. The \$136 was "due to a lot of investors in this industry looking to buy and hold uranium," says Nick Carter of the Ux Consulting Co. "It's now at a level where, in order for a lot of these new mines to be developed, there needs to be a much higher price."

Production costs help determine viability. "Production costs at Coles Hill are unknown," he says. "The costs typically are higher here than say Kazakhstan and the eastern countries because the regulatory system is much more stringent here than in Asia." Existing mines in Kazakhstan can produce below \$20 per pound, maybe even \$10, he says.

Ux Consulting forecasts uranium prices, but not for the press. "What I can tell you is that over the next couple of years, we see prices moving into the \$50s and \$60s," Carter says. "Beyond that, it's really going to be a function of what new projects come online. We're seeing nuclear growth in Asia, particularly in China and India."

Exploration expenditures in the United States increased 116 percent from 2006 to 2007. Production in the United States reached 4.5 million pounds of uranium oxide in 2007, according to the U.S. Energy Information Administration, about 4 percent of the world total, at six sites in the West. Canada currently produces about 23 percent, Australia about 21 percent, according to the World Nuclear Association. In Africa and Kazakhstan, uranium production is expected to grow to 40 million pounds annually. About 55 percent of the world's nuclear power fuel today comes from uranium, the rest from former military uses. That includes an annual 18 million to 24 million pounds of Russian high-enriched uranium. The agreement that allows this expires in 2013.

On the demand side, several utilities in the Fifth District have plans to build new reactors and many have filed for extensions on existing plants built decades ago. Activity is high in the District because every state except Maryland

regulates utilities. This nonmarket structure lets firms earn a rate of return on investments that can include reactors which ordinary investors might decline to fund. South Carolina Electric and Gas Co., for example, recently got new rates approved for building two reactors. Similarly, Dominion Power customers are already paying, via rate increases, for a coal-fired plant under construction in Wise County, Va.

The Unknown Element

The uranium mine at Coles Hill remains a largely "on paper" enterprise, with operations and output, employment, and other possible effects, good and bad, unknown to the larger community. No current laws address the mining of uranium. The Virginia General Assembly, if it lifted the moratorium, would amend mining laws and draft regulations, according to Mike Abbott of the Virginia Department of Mines, Minerals, and Energy, which regulates coal mines in the state, among other duties. "Our agency would be involved in drafting the language with input from a variety of stakeholders, including the general public."

Once the mine is decommissioned, then the U.S. Nuclear Regulatory Commission specifies how the tailings, or waste, are to be managed. How water flows through rock may affect that. From 1911 through the 1950s, a Canonsburg, Pa., site was inappropriately mined, but remediated by the government in the 1980s. While there were no milling-related traces in the surface waters of the nearby creek, the groundwater remains contaminated. Both surface and ground waters will be monitored in perpetuity, according to the Energy Information Administration. Mines in remote Canadian locations, however, could prove similar in geology and hydrology to Virginia, according to Virginia Uranium.

Because this hard rock mine is breaking new ground, the Piedmont Environmental Council has requested that Virginia sponsor original research. "The first thing to do is study those areas comparable to Virginia — rainfall, geology, hydrology — to see if it's ever been done properly," says Todd Benson, a council attorney. "Show us five places where it's been done comparably."

Virginia Uranium has offered to help pay for any study. Meanwhile, the firm's parent has sold an 8 percent stake to a Canadian resource firm, Santoy, to raise cash, and plans to go public in Canada first. The United States has been out of the uranium mining business since the price collapsed, and Coles notes that there's little mining expertise left on Wall Street.

Benson, for now, wants to make sure the study is sound. "It appears the best possible study will require you do in-the-field research," he says, because of Virginia's rainfall compared to the arid West. Waste lagoons could overflow in a heavy rain event, and inaccurate predictions would mean trouble. "Let's look at where it's been done — has it been done anywhere comparable to Virginia? If it's never been mined anywhere similar to Virginia, then at least we know we're in uncharted territory."

RF